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CHRYSOMELIDAE OF KANSAS

(Continued from Vol. II, No. 1, page 15)

By

J. R. DOUGLASS, Estancia, New Mexico.

Subfamily GALERUCINAE

Monocesta Clark

15720 **M. coryli** (Say). (Horn 6, LeConte, Popenoe 1). Douglas, Leavenworth, and Neosho Counties.

Trirhabda Lec.

15725 **T. brevicollis** Lec. (LeConte). Riley and Shawnee Counties. July. On sumac and prickly ash.

15727 **T. canadensis** (Kby.). (Horn 6, Knaus 4, Popenoe 1). Douglas, Gove, Johnson, Miami, Pottawatomie, Riley, and Shawnee Counties. June-July. On sumac and prickly ash.

15730 **T. nitidicollis** Lec. (Popenoe 2, Snow 1). Wallace County.

15733 **T. convergens** Lec. (Horn 6, LeConte 3, Popenoe 1). Douglas and Shawnee Counties. Beetles and larvae often abundant on **Zanthoxylum,** at times defoliating the shrub in a locality.

15734 **T. attenuata** (Say). (Horn 6, LeConte 3). Wallace Co.

Galerucella Cr.

15744 **G. americana** (Fab.). (LeConte 3, Popenoe 1). Douglas, Miami, Riley, and Shawnee Counties. July.

15745 **G. sexvittata** (Lec.). Pottawatomie Co.

15746 **G. cavicollis** (Lec.). Douglas and Riley Counties. July-September.

15749 **G. notulata** (Fab.). (Knaus 6, Snow 4). Clark, Douglas, Riley and Rooks Counties. July.

15750 **G. notata** (Fab.). (Popenoe 2). Western Kansas, Pottawatomie Co. July-September. Taken in swampy land.

15751 **G. nymphaeae** (L.). (Popenoe 2). Shawnee Co.

15752 **G. tuberculata** (Say). Bourbon, Riley and Shawnee Counties. September on **Solidago.**

15753 **G. decora** (Say). (Knaus 7). Douglas, Ellsworth, Gove, Pottawatomie and Wallace Counties. July.

Monoxia Lec.

15755 **M. puncticollis** (Say). (Knaus 2, Snow 4). Clark and Cloud Cos.

15756 **M. consputa** (Lec.). (Horn 6, Knaus 4, Popenoe 1, Snow 1). Finney, Gove, Hamilton, Riley and

Trego Counties.

Diabrotica Chev.

15768 **D. tricincta** (Say). (Popenoe 1, Snow 1, 4). Gove, Norton, and Wallace Counties. Common on **Cucurbita.**

15769 **D. duodecimpunctata** (Fab.). (Popenoe 1, Snow 1, 4). State wide. Chautauqua, Clark, Comanche, Douglas, Finney, Gove, Hamilton, Riley, Russell, Shawnee and Wallace Counties. April-September. On alfalfa, **Amorpha fruticosa,** clover, corn, common and lima beans, eggplant, cucumber, salvia, and sorghum. Increasing as a pest in the state.

15769a **D. duodecimpunctata** var. **tenella** Lec. (Snow 4). Clark Co.,

15774 **D. longicornis** (Say). (LeConte 3, Popenoe 1). Statewide. Douglas, Doniphan, Riley and Seward Counties. July-October. On corn, salvia, **Cirsium** and sunflowers. Larvae Common on corn roots.

15777 **D. atripennis** (Say). (Horn 6, LeConte 3, Popenoe 1). Douglas, Pottawatomie, Riley, Rooks and Reno Counties. June-July. On **Amorpha fruticosa,** corn and radish.

15777b **D. atripennis** var. **fossata** Lec. (Knaus 4). Pottawatomie and Riley Counties.

15779 **D. blandula** Lec. (Snow 1, 4). Gove, Hamilton and Wallace Counties.

15782 **D. vittata** (Fab.). (Popenoe 1, 2, Snow 4). Bourbon, Doniphan, Douglas, Hamilton, Meade, Neosho, Riley and Wallace Counties, April-July. On cucumbers, common and lima beans, and on plum trees.

Phyllobrotica Redt.

15788 **P. decorata** (Say). (Popenoe 1). Douglas, Riley and Shawnee Counties. Collected in July by sweeping grass.

15790 **P. nigritarsis** Linell. (Knaus 7, Linell 2). Riley. Saline and Shawnee Counties. July.

15792 **P. discoidea** (Fab.). (Popenoe 1). Douglas, Kiowa, Pottawatomie, Riley and Shawnee Counties. May-June.

15794 **P. limbata** (Fab.). (Knaus 4). Pottawatomie Co.

Luperodes Mots.

15810 **L. varicornis** Lec. (Knaus 3, Linell 2, Popenoe 1). Douglas, Kiowa, Riley, Saline, Shawnee and Wilson Counties. July-August. On composite

flowers.

15815 **L. thoracicus** (Melsh.). (Knaus 4, LeConte 3, Linell 2). Pottawatomie, Riley and Shawnee Counties. May-June. On common and lima beans, and plum trees.

15823 **L. meraca** (Say). (Knaus 7, LeConte 3, Linell 2). Kansas.

Phyllecthrus Lec.

15850 **P. gentilis** Lec. (Knaus 7). Shawnee Co.

15850a **P. gentilis** var. **nigripennis** Lec. (Knaus 1). Eastern Kans. Kiowa, Pottawatomie, Riley, and Saline Counties. May.

15851 **P. dorsalis** (Oliv.). (LeConte 3, Popenoe 1). Douglas Co.

Galeruca Geoffr.

15852 **G. externa** Say. (Horn 6, LeConte 3, Popenoe 2). Douglas Co.

Cerotoma Chev.

15854 **C. trifurcata** (Forst.). (Horn 6, Popenoe 1). Douglas, Labette, Pottawatomie and Riley Cos. May-June. On garden and lima beans.

Subfamily HALTICINAE

Blepharida Rogers

15858 **B. rhois** (Forst.). (Popenoe 1). Douglas, Graham and Riley Counties. April-June. On sumac and smoketree. Bushes often defoliated.

Pachyonychus Chev.

15860 **P. paradoxus** Melsh. (Popenoe 1). Saline and Shawnee Cos.

Hypolampsis Clark

15861 **H. pilosa** (Ill.). (Popenoe 2). Douglas Co.

15862 **H. mellyi** Cr. (Crotch, Horn 3, Knaus 7). Gove, Pottawatomie, Stafford, and Trego Counties. July.

Oedionychis Latr.

15865 **O. gibbitarsa** (Say). (Crotch, Popenoe 1). Douglas, Miami, Montgomery, Neosho, Riley and Wilson Counties. May-October. Found hibernating under stones on high prairie in January and April.

15867 **O. thoracica** (Fab.). (Popenoe 1). Douglas and Riley Cos. May. Found hibernating under stones in February and March.

15868 **O. vians** (Ill.). (Popenoe 1, Snow 1). Douglas Shawnee and Wallace Counties.

15869 **O. concinna** (Fab.). Douglas Co. July.

15877 **O. miniata** (Fab.). Douglas, Riley and Shawnee Counties. June-September.

15885 **O. thyamoides** Cr. (Popenoe 1). Douglas, Gove, Riley, Saline and Shawnee Counties. March to September on grass.

15886 **O. limbalis** Melsh. (Knaus 1). Saline Co.

15887 **O. sexmaculata** (Ill.). (Popenoe 2). Douglas, Riley, Shawnee and Wilson Counties. Frequent on **Teucrium.**

15889 **O. quercata** (Fab.). Reno Co.

15890 **O. scalaris** Melsh. (Crotch, Horn 3, LeConte 2, Knaus 7). Pottawatomie and Riley Cos.

Homophoeta Er.

15891 **H. aequinoctialis** (L.) (Popenoe 1). Douglas Co.

15892 **H. lustrans** Cr. (Knaus 7). Reno Co.

Disonycha Chev.

15895 **D. pennsylvanica** (Ill.). (Popenoe 1). Douglas, Miami, Pawnee, Riley and Rooks Counties. May-August. On corn and **Salix.**

15895a **D. pennsylvanica** var. **limbicollis** Lec. (Popenoe 1). Douglas Co.

15896 **D. quinquevittata** (Say). (LeConte 2, Popenoe 1, Snow 4). Comanche, Douglas, Hamilton, Logan, Norton, Pawnee, Riley, Seward, Shawnee and Wallace Counties. April-August. On plum and willow trees; found in abundance on purslane.

15897 **D. crenicollis** (Say). (Knaus 1). Cowley, Douglas, Pottawatomie and Riley Counties. April-September. On alfalfa, clover and prairie clover. Found hibernating under stones in January.

15898 **D. caroliniana** (Fab.). (Popenoe 1, Snow 1). Comanche, Riley, and Wallace Counties. April-July. On plum and willow trees.

15901 **D. glabrata** (Fab.). (Knaus 1). Allen, Cherokee and Comanche Counties.

15902 **D. abbreviata** Melsh. (Snow 1, 4). Clark, Douglas, Gove, Riley and Wallace Counties.

15904 **D. discoidea** (Fab.). (Popenoe 2). Douglas County.

15906 **D. triangularis** (Say). (Popenoe 1, Snow 1, 4). Clark, Douglas, Ellis, Gove, Lane, Meade, Reno, Riley, Shawnee and Wallace Counties. July-September. On corn, sorghum, weeds and wheat.

15907 **D. xanthomelaena** (Dalm.). (Horn 3, Popenoe

1). Douglas, Montgomery and Riley Counties. April-June. On **Chenopodium,** cabbage and wheat. Found hibernating under logs, rubbish and stones from January to March.

15908 **D. politula** Horn. Douglas County.

15909 **D. cervicalis** Lec. (Horn 3, LeConte 3). Kansas.

15910 **D. mellicollis** (Say). (Popenoe 2). Douglas County.

15911 **D. collata** (Fab.). (Knaus 4). Douglas, Pottawatomie, Riley, Shawnee and Wilson Counties. June.

Haltica Geoffr.

15916 **H. bimarginata** Say. (Popenoe 2). Douglas, Gray, Riley, Saline, Shawnee and Wallace Counties. July.

15917 **H. chalybea** Ill. (Popenoe 1). Douglas and Riley Counties. June.

15920 **H. ignita** Ill. (Knaus 6, Popenoe 2). Douglas, Reno, Riley, and Shawnee Counties. May. Collected on willow.

15932 **H. vicaria** Horn. Douglas and Shawnee Counties.

15933 **H. carinata** Germ. Western Kansas, Lane and Morton Counties.

15934 **H. torquata** Lec. (Horn 3, Popenoe 2, Snow 1). Gove, Riley and Wallace Counties. June-August. On sorghum and weeds.

15936 **H. obliterata** Lec. (Popenoe 2). Douglas, Kingman, Pottawatomie, Riley and Shawnee Counties. June-October. On prairie clover and salvia.

15942 **H. marevagans** Horn. Riley County. June-October. Collected on **Gaura.**

15946 **H. foliacea** Lec. (Horn 3, Knaus 4, Popenoe 1, Snow 1, 4). Comanche, Douglas, Gove, Kiowa, Meade, Norton, Pratt, Pottawatomie, Riley and Wallace Counties. May-September. On apple trees, **Euphorbia marginata** and **Gaura.**

15947 **H. lazulina** Lec. Cheyenne County.

15949 **H. fuscoaenea** Melsh. (Snow 2). Douglas County.

Diphaulaca Clark

15964 **D. bicolorata** Horn. (Horn 3, Knaus 7). Kansas.

Trichaltica Harold

15965 **T. scabricula** (Cr.). (Popenoe 2). Shawnee County.

Chalcoides Foudr.

15968 **C. helxines** (L.). Popenoe 1, 2, Snow 1, 4). Douglas, Gove, Hamilton, Shawnee and Riley

Counties. April-July. On cherry and willow.

Crepidodera Chev.

15969 **C. erythropus** Melsh. (Popenoe 2). Riley and Shawnee Counties.

15971 **C. longula** Horn. (Horn 3, Knaus 3). Pottawatomie, Riley, Saline, Osage and Wilson Counties. June-July. Taken on willow.

15974 **C. atriventris** Melsh. Douglas County.

15975 **C. nitens** Horn. Harvey County. August.

Hippuriphila Foudr.

15977 **H. modeeri** (L.). (Popenoe 2). Douglas and Riley Counties.

Epitrix Foudr.

15979 **E. fuscula** Cr. Eastern Kansas. Pottawatomie, Riley and Shawnee Counties. July. Collected on eggplant.

15980 **E. humeralis** Dury. (Knaus 8). Douglas, McPherson and Riley Counties. May-July.

15981 **E. lobata** Cr. (Knaus 4). Pottawatomie and Riley Counties.

15982 **E. cucumeris** Har. (Popenoe 1). Douglas and Riley Counties. April-July. On plum trees, radish; abundant on potato and **Cucurbitaceae.**

15983 **E. brevis** Sz. Riley County.

15984 **E. fasciata** Blatch. (Popenoe 2). Shawnee County.

15986 **E. parvula** (Fab.). (Knaus 1, Popenoe 2). Douglas, Hamilton, Kiowa, Saline and Wilson Counties.

Orthaltica Cr.

15988 **O. copalina** (Fab.). (Popenoe 1). Douglas and Shawnee Counties. Abundant on **Rhus glabra.**

15989 **O. melina** Horn. (Horn 3, Knaus 4). Douglas, Pottawatomie and Riley Counties.

Luperaltica Cr.

15991 **L. fuscula** (Lec.). (Crotch, Popenoe 2). Phillips, Pottawatomie and Shawnee Counties.

15992 **L. senilis** (Say). (Popenoe 2). Shawnee County.

Mantura Steph.

15993 **M. floridana** Cr. (Knaus 4). Jewell and McPherson Counties.

Chaetocnema Steph.

15998 **C. subcylindrica** Lec. Douglas County.

15999 **C. protensa** Lec. Riley and Shawnee Counties. May-August.

16001 **C. denticulata** (Ill.). (Crotch, Popenoe 1, Snow 1, 4). Clark, Douglas, Gove, Riley and Shawnee Counties. May-October. On sorghum.

16002 **C. cribrifrons** Lec. Douglas and Riley Counties. May-July.

16003 **C. pinguis** Lec. Riley County. July.

16009 **C. subviridis** Lec. (Horn 3, Popenoe 2, Snow 1). Douglas, Gove, Riley and Shawnee Counties. June-July. On grasses and wheat.

16014 **C. pulicaria** Melsh. Douglas and Riley Counties. April-August. On sorghum and plum.

16018 **C. elongatula** Cr. (Horn 3, Knaus 7). Kansas.

16021 **C. decipiens** Lec. (Horn 3, Knaus 7). Kansas.

Systena Clark

16022 **S. hudsonias** (Forst.). (Popenoe 1). Southern Kansas. Douglas, Riley and Shawnee Counties. May.

16023 **S. pallicornis** Schffr. (Snow 2). Douglas, Kiowa and McPherson Counties.

16028 **S. taeniata** (Say). (Horn 3, Popenoe 1). Douglas, Riley, and Saline Counties. June. On cocklebùrr. The Saline County specimen may be specifically distinct from **S. taeniata** and its various subspecies or varieties, but should not be described from a single specimen, according to E. A. Schwarz.

16029 **S. marginalis** (Ill.). (Knaus 1). Douglas, Kearney, Riley, and Wilson Counties. August. Collected on clover.

Longitarsus Latr.

16033 **L. subrufus** Lec. (Horn 3, Knaus 7). Douglas, Riley, and Shawnee Counties. June-July.

16034 **L. turbatus** Horn. (Knaus 6). Pottawatomie County.

16043 **L. alternatus** (Zieg.). Riley County.

16047 **L. testaceus** Melsh. (Knaus 4). Kearney, Pottawatomie, Riley and Shawnee Counties. June-July. On cockleburr and wheat.

16049 **L. melanurus** Melsh. (Horn 3). Douglas, Pottawatomie, Riley and Shawnee Counties. June. Common on **Onosmodium.**

Glyptina Lec.

16056 **G. bicolor** Horn. (Horn 3, Knaus 7). Kansas.

16058 **G. cyanipennis** Cr. (Snow 3). Douglas County.

16061 **G. spuria** Lec. (Popenoe 1). Douglas, McPherson, Riley, and Saline Counties. May-June. On cockleburr.

16063 **G. atriventris** Horn. Riley County. April. Collected on cherry trees at night.

Phyllotreta Foudr.

16065 **P. sinuata** (Steph.). (Knaus 1). Eastern and southern Kansas. Riley, Saline and Shawnee Counties. May-July. On **Amorpha fruticosa,** pepper grass and wheat.

16066 **P. vittata** (Fab.). (Popenoe 1, Snow 1). Eastern and southern Kansas. Douglas, Gove and Riley Counties. May-July. On radish and plum trees. Very abundant and destructive to garden **Cruciferae;**.. found also on wild plants of the same order, especially **Lepidium.**

16067 **P. oregonensis** (Cr.). Riley County.

16068 **P. robusta** Lec. Rawlins and Riley Counties. May. Swept from oats and wheat.

16072 **P. albionica** (Lec.). (Knaus 1). Western Kansas, Wilson County.

16074 **P. bipustulata** (Fab.). (Popenoe 2). Southern Kansas. Douglas, Riley and Shawnee Counties.

16077 **P. lewisi** (Cr.). (Popenoe 2). Hamilton and Riley Counties.

16078 **P. aeneicollis** (Cr.). (Horn 3). Douglas, Osage, Pottawatomie and Riley Counties. April-July.

16080 **P. pusilla** Horn. (Knaus 5, Snow 4). Morton and Riley Counties. July-November. Collected on radish and wheat.

16081 **P. picta** (Say). (Popenoe 1). Southern Kansas. Pottawatomie, Riley and Shawnee Counties.

Aphthona Chev.

16082 **A. texana** (Cr.). (Popenoe 1, Snow 1). Cheyenne, Douglas, Riley, Shawnee and Wallace Counties. May-September. On aster, cocklebur, **Grindelia,** salvia, sunflowers, and **Euphorbia marginata.**

Dibolia Latr.

16086 **D. borealis** Chev. (Snow 2). Douglas and Riley Counties. April-July. On apple trees.

Psylliodes Latr.

16089 **P. punctulata** Melsh. (Horn 3, Knaus 1). Riley and Saline Counties. May-June.

16090 **P. convexior** Lec. (Knaus 7). Douglas and Riley Counties. May-November. On pepper grass and wheat; found hibernating in rubbish during March.

16093 **P. elegans** Horn. (Knaus 7, Horn 3). Kansas.

Subfamily HISPINAE

Stenispa Baly.

16094 **S. metallica** (Fab.). Douglas County.

16095 **S. collaris** Baly. (Knaus 1, Popenoe 1, Snow 2). Leavenworth, Miami and Shawnee Counties.

Anisostena Weise

16096 **A. nigrita** (Oliv.). (Popenoe 1). Douglas, Gove, Riley, Shawnee, and Wallace Counties. July-August.

16099 **A. perspicua** Horn. Riley County. September.

Anoplitis Chap.

16105 **A. inaequalis** (Web.). (Knaus 1). Bourbon, Cherokee, Douglas, Riley, Saline, Shawnee and Wilson Counties. May-August.

16106 **A. rosea** (Web.). (Popenoe 1). Shawnee County.

Chalepus Thunb.

16108 **C. walshi** (Cr.). (Knaus 8). Pottawatomie County.

16109 **C. bicolor** (Oliv.). (Snow 2). Douglas and Riley Counties. May.

16111 **C. scapularis** (Oliv.). (Popenoe 1). Shawnee County. On **Corylus.**

16113 **C. dorsalis** Thunb. (Snow 2, 4). Clark, Douglas, Hamilton and Morton Counties.

16114 **C. horni** (Smith). Douglas and Riley Counties. July-September.

Baliosus Weise

16116 **B. ruber** (Web.). Eastern Kansas, Douglas and Pottawatomie Counties. April-October.

Uroplata Baly.

16126 **U. porcata** (Melsh.). (Popenoe 2). Wallace County.

Microrhopala Baly.

16129 **M. vittata** (Fab.). (Snow 3). Butler, Cowley, Douglas, Linn, Pottawatomie, Riley and Shawnee Counties. July.

16129a **M. vittata** var. **laetula** (Lec.). (LeConte 2, Popenoe 1). Geary, Rooks and Shawnee Counties.

16133 **M. excavata** (Oliv.). (Knaus 4). Pottawatomie, Riley and Wallace Counties. July-September. Collected on **Solidago.**

16135 **M. cyanea** (Say). (Popenoe 1, Snow 1, 4). Arkansas River Valley. Bourbon, Clark,

Douglas, Ellis, Ford, Kiowa, Linn, Norton, Riley, Rooks and Wallace Counties. June-July.

Subfamily CASSIDINAE

Chelymorpha Boh.

16139 **C. cassidea** (Fab.). (Barber, Popenoe 1). Douglas, Johnson, Riley and Seward Counties. July-August. On **Euphorbia marginata, Solidago,** wild morning glory and corn.

16139a. **C. cassidea** var. **lewisi** Cr. (Popenoe 2, Snow 1). Clark, Finney, Gove, Reno and Wallace Counties.

16139b, **C. cassidea** var. **phytophagica** Cr. Gray, Hodgeman, Norton, Riley and Seward Counties. May-July. On wild and bush morning glory.

16139c **C. cassidea** var. **17-punctata** (Say). (Snow 4). Clark, Hamilton and Norton Counties.

Physonota Boh.

16142 **P. unipunctata** (Say). (Barber, Popenoe 1). Douglas and Riley Counties. June-July. On **Salvia** and **Vernonia.**

Jonthonota Spaeth

16149 **J. nigripes** (Oliv.). (Barber, Popenoe 1). Barber, Clark, Douglas, Gove, Greeley, Johnson, Montgomery, Riley, Seward and Sumner Counties. June-September.

16149b **J. nigripes** var. **ellipsis** (Lec.). (Popenoe 2, Snow 1). Douglas, Gove and Wallace Counties.

Gratiana Spaeth

16150 **G. pallidula** (Boh.). (Barber, Knaus 4). Douglas, Kiowa, Riley and Sumner Counties. June-September. On eggplant.

Chirida Chap.

16152 **C. guttata** (Oliv.). (Popenoe 1, Snow 4). Douglas, Hamilton, Montgomery, Riley and Shawnee Counties. May-September. On **Ipomoea leptophylla,** honey locust and corn.

Deloyala Chev.

16155 **D. clavata** (Fab.). (Barber, Popenoe 1). Cherokee, Doniphan, Douglas, and Riley Counties. Found on potato leaves.

Metriona Weise

16156 **M. bivittata** (Say). (Popenoe 1). Douglas, Riley and Saline Counties. May-September. On sweet potato vines.

16157 **M. bicolor** (Fab.). (Popenoe 1). Douglas, Pot-

tawatmomie, and Riley Counties. May-June.

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LEAFHOPPERS AND THE TRAP LIGHT

BY

*PAUL B. LAWSON, Lawrence, Kansas.**

Purpose—During the season of 1928, the writer ran a trap light at Lawrence, Kansas, to see what data might be obtained relative to a number of problems having to do with leafhoppers. Among the questions on which information was desired were the following:

How abundantly do these insects come to lights? How regularly? How often in unusual numbers? What weather conditions prevail when they come in large numbers? How many species in a given community are attracted to lights? What is the relative abundance of these species? Would new or rare species be taken? Would information be given as to the life history or number of broods per season of any of the species?

What follows gives partial answers, at least, to some of these questions.

Apparatus—The light first used was an ordinary arc light, suspended under a suitable shelter which protected the entire apparatus except against the worst storms. Later in the season this light was changed to a 200-watt Mazda bulb, which proved more reliable than the arc light which frequently got out of order—hence the rather regrettable gaps in the season's collecting. About six inches below the light was a funnel nearly two feet wide, tapering to a tube four inches in diameter. The total length of this tube was about eighteen inches, but it was made in three sections, the lower two being removable. The lowest section was three inches long, and in this the potassium cyanide was placed, enclosed in a perforated two-ounce tin box and renewed once or twice a week. The section above this was about six inches long, and had near the lower end a wire screen of about nine meshes to the inch. On top of the funnel was another screen of four meshes to the inch which kept out many of the moths, June beetles, etc. The medium-sized insects were then caught above the lower screen and the leafhoppers for the most part, fell to the lowest section of the tube.

Numbers and Chief Species Taken—Out of the 76 nights during the season when the trap was operated, there were six nights when no leafhoppers were taken —September 25 to October 1, inclusive. Only a single specimen was taken on September 28. On the 70 nights

*Contribution from the Department of Entomology, University of Kansas.

when catches were made, a total of 70,966 specimens was taken, or an average of over 1000 per night. The following table of the season's catch shows the main results:

TABLE OF SEASON'S CATCH

Draeculacephala mollipes	29,451
Euscelis obscurinervis	16,435
Deltocephalus inimicus	8,222
Phlepsius irroratus	6,610
Thamnotettix nigrifrons	3,264
Empoasca fabae	2,383
Cicadula sexnotata	1,033
Eutettix seminudus	522
Deltocephalus favicosta	389
Eugnathodus abdominalis	299
Agallia constricta	240
Scaphoideus immistus	191
Gypona octolineata var. striata	189
Eutettix chenopodii	147
Chlorotettix viridius	116
Xestocephalus pulicarius	106
Chlorotettix tunicatus	101
109 other species and varieties	1,268
126 species and varieties	70,966

It will be seen from the above that **Draeculacephala mollipes** comprised 41% of the season's catch; **Euscelis obscurinervis,** 23%; **Deltocephalus inimicus,** 11%; and **Phlepsius irroratus,** 9%; and that these four species alone made up 85% of the total catch of the season.

List of Species: The following is a list of the species taken during the season:

Agallia constricta
Agallia novella
Agallia uhleri
Idiocerus verticis
Idiocerus nervatus
Macropsis viridis
Oncopsis distinctus
Bythoscopus apicalis
Kolla bifida
Graphocephala coccinea
Draeculacephala mollipes
Helochara communis
Gypona octolineata var. striata
Gypona octolineata var. cana
Thamnotettix clitellarius
Chlorotettix tunicatus
Chlorotettix viridius
Chlorotettix vividus
Chlorotettix spatulatus
Chlorotettix nudatus
Chlorotettix minor
Chlorotettix galbanatus
Chlorotettix balli
Cicadula sexnotata
Cicadula variata
Cicadula lepida
Balclutha impicta
Balclutha punctata
Eugnathodus abdominalis
Alebra albostriella

Gypona scarlatina
var. **puncticollis**
Xerophloea viridis
Xestocephalus pulicarius
Xestocephalus superbus
Spangbergiella vulnerata
Parabolocratus flavidus
Parabolocratus viridis
Dorydiella floridana
Scaphoideus auronitens
Scaphoideus immistus
Scaphoideus luteolus
Scaphoideus cinerosus
Scaphoideus scalaris
Platymetopius acutus
Platymetopius cinereus
Platymetopius frontalis
Platymetopius scriptus
Platymetopius cuprescens
Platymetopius magdalensis
Deltocephalus inimicus
Deltocephalus striatus
Deltocephalus osborni
Deltocephalus sonorus
Deltocephalus balli
Deltocephalus lawsoni
Deltocephalus flavicosta
Deltocephalus obtectus
Deltocephalus weedi
Euscelis obscurinervis
Euscelis striolus
Euscelis parallelus
Eutettix seminudus
Eutettix chenopodii
Eutettix cinctus
Eutettix stactogalus
Eutettix johnsoni
Phlepsius irroratus
Phlepsius majestus
Phlepsius collitus
Phlepsius cinereus
Phlepsius punctiscriptus
Phlepsius altus
Thamnotettix nigrifrons
Thamnotettix longulus
Thamnotettix perspicillatus
Thamnotettix fitchii
Thamnotettix ciliatus
var. **fulveola**
Alebra albostriella
var. **pallidula**
Dikraneura abnormis
Dikraneura celtidis
Dikraneura fieberi
Alconeura unipuncta
Empoasca flavescens
Empoasca fabae
Empoasca birdii
Empoasca obtusa
Empoasca denticula
Hymetta trifasciata
Typhlocyba rosae
Typhlocyba modesta
Typhlocyba gillettei
var. **gillettei**
Typhlocyba gillettei
var. **casta**
Typhlocyba gillettei
var. **saffrana**
Erythroneura tricincta
Erythroneura tricincta
var. **calycula**
Erythroneura tricincta
var. **cymbium**
Erythroneura vitis
Erythroneura vitis
var. **flava**
Erythroneura vulnerata
Erythroneura beameri
Erythroneura fulvocephala
Erythroneura campora
Erythroneura omaska
Erythroneura vitifex
Erythroneura basilaris
Erythroneura basilaris
var. **dulcis**
Erythroneura noevus
Erythroneura lawsoniana
Erythroneura fraxa
Erythroneura niger
var. **nigerrima**
Erythroneura elegans
Erythroneura kanza
Erythroneura obliqua
Erythroneura sp. n.
Eight new species.

Rare and New Species: The genus **Erythroneura**,

while represented by relatively few specimens, was nevertheless by far the best represented genus as to number of species for there were 29 species and varieties of this genus taken during the season. In no other genus were more than nine species taken. All the **Erythroneura** material was worked over by Dr. R. H. Beamer, who reports that the material contains eight species new to science, which will be described in the near future. These were the only new spcies taken all season.

A number of species taken, however, proved to be rather unusual for this locality and a number of other specimens represent species which are known to science from relatively few specimens. The specimen of **Dorydiella floridana** extends the range of this species to west of the Mississippi. The specimens of **Deltocephalus lawsoni** are the only ones that seem to have been taken in addition to the type specimens. **Thamnotettix perspicillatus** is recorded for the first time from the state, as are also **Chlorotettix nudatus, Chlorotettix minor, Entettix johnsoni and Scaphoideus luteolus.** The specimens of **Alebra albostriella** var. **fulveola** and var. **pallidula** represent forms rather uncommon in collections. **Dikraneura celtidis,** recently described from Ohio, is taken for the first time far from the type locality. The taking of **Alconeura unipuncta, Empoasca birdii** and **Empoasca denticula** make new records for the state, making a total of eighteen species added to the state list through the season's catch.

Data on Life History:—Realizing that definite data on such life history problems as the number of generations per season are hard to get, due to the complication caused by the overlapping of broods, it was nevertheless felt that in some cases, at least, collecting these species at a light throughout the season might yield ineresting information on such questions.

It has generally been felt that leafhoppers in the north, at least, have either one, or more usually, two generations per season. Recent studies in Kansas show that in some species there are three or four generations. It has been shown, for example, that **Eutettix chenopodii** has three generations a year and that **Erythroneura ziczac,** living on Boston ivy, has four generations a season. The discussions on several of the important species given below tend to show the possibility of more than two generations a year in some species thought to be two-brooded, and also, we believe, give some information as to the time of appearance of the several gener-

ations.

Draculacephala mollipes. Osborn states there are two distinct generations a year in Ohio. Gibson says there are six generations per year in Arizona, the nymphs of the first generation hatching as early as March 4, and the adults appearing as early as April 20. In the north the species is thought to hibernate in the egg stage. This season, the first adults were taken at the light on May 10, indicating either the hibernation of some adults or, more likely, an earlier appearance of the first generation than had been recognized for this latitude. By June 15, there was a large emergence and undoubtedly the first generation had largely developed about that time. The numbers then decreased during the last of June and the first few days of July, but increased again about the middle of July. A third peak was reached about August 17, and a fourth about the middle of September. The data, therefore, which were obtained, indicate the possibility of four gnerations a year for Kansas, as against the two in Ohio and the six in Arizona.

Phlepsius irroratus: This species has also been thought to be two-brooded. This past season, adults were taken as early as May 3, but the largest numbers of this generation were evident May 24, and large numbers remained till after the middle of June. There was another increase in numbers during the last of July and again about the middle of September. There would seem to be an indication, therefore, of three broods for the season.

Deltocephalus inimicus: Another species hitherto believed to be two-brooded. Osborn states adults appear during last of June and again during last of August, also that it takes some forty days from the egg to the adult stage. DeLong states that adults may be found throughout the year, though the species also hibernates in the egg stage. He also believes, however, that there are two generations, the first extending from about June first into August, the second from about the middle of August till cold weather.

This season, adults were taken as early as May 3, and they became quite common during the latter part of the month. They continued to be abundant till toward the latter part of June, when they materially decreased in number. Their numbers increased again about the middle of July and remained abundant till the latter part of August when they decreased. About the middle of September, however, there was another strong in-

crease. The results give some reason, therefore, to believe that there are three generations per season in our latitude.

Euscelis obscurinervis: The first adults of this species were taken May 3. Their numbers were rather low, however, till about the middle of June, when undoubtedly the first brood largely emerged. During the last of June and the first half of July, they were relatively few, but increased in number quite materially during the last of July. Then came another slump in numbers about the last of August, followed by another rise near the middle of September. These data indicate the possibility of three generations per season.

The catches made of **Empoasca fabae** and **Cicadula sexnotata** also indicate the possibility of three generations per season in our latitude. These studies on life history simply raise the question anew as to whether there are more than two broods or not, at least for the species mentioned. Further systematic collecting at light and actual rearings in the laboratory will be necessary before we can be at all sure of the facts.

Sex Attracted:—No definite rule can seemingly be laid down as to the relative attraction of the sexes to light. As mentioned further on, undoubtedly certain meteorological conditions tremendously favor attraction. If a brood should be in its latter stages, therefore, when presumably the males have already died leaving mostly females, and a favorable night then occurs, of course the count would show chiefly females. The following data seem to show how impossible it is to generalize on the matter:

Out of 95 specimens of **Dikraneura fieberi** taken on 27 different nights from May 3 to October 7, all but four were males. On the other hand, a count of all the species not occurring in large numbers through the season, showed a total of 1296 females as against 1700 males. A catch of **Phlepsius irroratus** showed 50 females and 68 males. A catch of **Eutettix seminudus** showed 120 females to 160 males, while another count showed 250 females and 80 males of **Cicadula sexnotata.** A count of a lot of **Draeculacephala mollipes** showed 2010 females and 498 males, while a catch of **Deltocephalus inimicus** shows 489 females to 637 males. A lot of **Euscelis obscurinervis** was composed of 425 females and 487 males.

Meterological Factors—A very casual glance at the records indicates clearly that weather conditions play a very important part in determining the catch for the

night. Thus, June 21 was the best night in the month pretty clearly because it was the warmest, the temperature being 80 degrees at 7:00 P. M. Cold weather, rain and strong winds, of course, act unfavorably. On the other hand, there seems to be a combination of weather conditions, at times, which undoubtedly is responsible for a tremendous swarming of leafhoppers to the lights. Such swarmings have been repeatedly spoken of, by a number of workers. Moreover, there seems to be indication that certain weather conditions attract certain species to the light while other species quite abundant at the same time are not attracted till another combination of weather factors arrives to affect them favorably. Thus on October 7 and 8, 2225 specimens of **Draeculacephala mollipes** were taken, and only 3 specimens were taken on October 17, when they were undoubtedly equally abundant. By contrast, on October 7 and 8, there were taken 56 specimens of **Cicadula sexnotata** as against 300 on October 17, and undoubtedly there were just as many specimens of this species in the neighborhood on October 7 as on October 17.

During the past season, there were at least four unusually favorable nights for the attraction of leafhoppers to the light. Other such periods occurred on September 16 and 17 and also September 7 and 8, but since the catches of these nights were not kept separate, they are not considered here. The following table shows the catches on the four dates mentioned:

TABLE SHOWING LARGEST CATCHES

	Aug. 11.	Aug. 17.	Aug. 30.	Sept. 13.
Total Catch	9,786	5,502	2,747	10,684
Dr. mollipes	4,832(2)	2,199(5)	825(6)	7,700(1)
Eu. obscurinervis	3,525(1)	2,689(2)	115	2,300(4)
Del. inimicus	516(4)	71	21	160
Ph. irroratus	483(1)	344(4)	61	130
Th. nigrifrons	36	39	1,116(1)	180(5)
Emp. fabae	50	45	371(1)	9
Cicad. sexnotata	88(3)	15	3	3

Species listed above are the only ones of which over 1,000 specimens were taken during the season. The figures in parentheses denote relative catch of species for season.

These were the four largest catches on single nights during the season. When so many large catches of the several species come on the same night, it seems evident that in addition to there being a large number of the

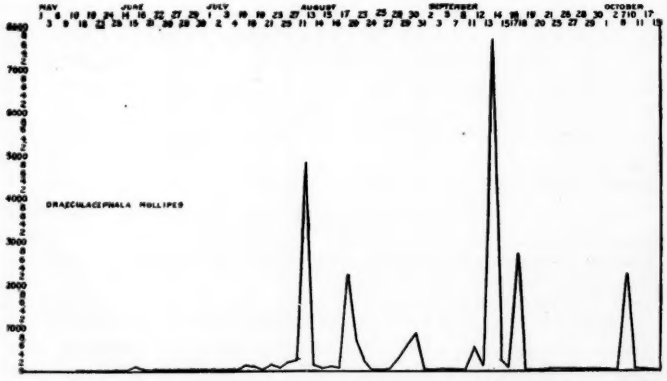
species involved, in the neighborhood, there must be certain weather conditions that act as a special spur to attract them to the light. This is all the more evident when we consider the catch of a given species for the nights of the swarming and for the nights immediately following and preceding the most favorable night. Thus on September 12, 128 specimens of **Draeculacephala mollipes** were taken. This catch was followed by 7700 on September 13, and the number dropped to 250 on September 14. Undoubtely there was something peculiarly favorable in the weather on September 13. This is still more apparent when we consider a larger record for the catch of that night.

CATCH OF AUGUST 11TH

Draeculacephala mollipes	4832(2)
Euscelis obscurinervis	3525(1)
Deltocephalus inimicus	516(4)
Phlepsius irroratus	483(1)
Cicadula sexnotata	88(3)
Agallia uhleri	52(1)
Xerophloea viridis	41(1)
Deltocephalus flavicosta	40(3)
Agallia constricta	25(2)
Scaphoideus immistus	18(3)
Eutettix stactogalus	7(1)
Platymetopius cinereus	5(1)

(Figures in parentheses denote relative catch of species for season.)

Undoubtedly temperature is quite important, as is shown by the following chart on **Draeculacephala mollipes:**



When twelve species are taken on the same night

in catches which do not range lower than the fourth largest for the entire season for each of the species concerned, it is evident that there was something peculiarly conducive in the weather conditions that night to attract them to the light.

On September 13, the temperature at 7:00 P. M. was 81 degrees as against 75 degrees on September 12 and 70 degrees on September 14. This may partially account for th swarming of September 13, but on August 17 and again on August 30, when swarms also occurred, the temperature was but 72 degrees. However, in most cases, where the catches were large the temperature at 7:00 P. M. ranged from 72 degrees to 82 degrees.

In the case of the majority of large catches, the wind was from an easterly direction, but large catches occurred with the wind from other directions. The humidity at 7:00 P. M. on days of large catches ranged from 47 to 95 per cent, usually being found in the 60's or 70's. On some of these nights, the sky was perfectly clear, while on others it was cloudy, and sometimes there was rain.

The work done this season has simply served to bring us to the conclusion that many weather factors are involved, and that much more work of a more careful nature must be done before we can hope to have any definite knowledge whatever of the weather factors conducive to light attraction. Another season, the writer intends to repeat this experiment getting complete meteorological data on at least the following factors: Temperature, direction and velocity of wind, humidity, rain, cloudiness, and barometric records not only of the particular day concerned but of those preceding and following these days.

A NEW CICINDELA (COLEOPTERA, CICINDELIDAE)

By W. KNAUS, McPherson, Kansas.

Cicindela tanneri Knaus, n. sp.

Upper surface reddish brown with greenish reflections; not shining. Under side of thorax brilliant coppery red extending back toward the abdominal segments, which are blue; under side of head also blue. Femora blue. Tibiae and taesi green.

Elytra densely granulately punctured; narrowest at humeri, and widening slightly until reaching their greatest width at three-fifths of their length. Thorax narrowest behind head and widest at mid length. Densely punctured and covered with long white decumbuit hairs. Front of head with white hairs and a bunch of stiff white hairs near base of antennae. Labrum white in both sexes

tridentate but not markedly so. Mandibles white on upper side extending half their length. Outer half mandibles coppery black. Lower surface of body and legs covered with long white hairs, decoument on abdomen and erect on thorax and legs. Short erect hairs on tarsi.

Full white elytral markings connected at maegiu in the females, but disconnected in front of the apical lunule in males. Length, females, 9.5-10 mm., males 9 mm. Width, females, 4.5 mm., males, 4 mm.

Received from Vasco M. Tanner of Brigham Young University, Provo, Utah and named in his honor. Collected at Green River, Utah.

Holotype, male, and Allotype, female, in my collection, and Paratype, female, in collection of Vasco M. Tanner. Three specimens examined.

Tanneri is close to *willistoni* Lec. but can be easily separated from that species on account of its smaller size, not shining coppery on elytra and thorax surface, punctures and granules fine, front not bare, white on mandibles much longer, and white marigin of elytra of males being interrupted before apical lunule.

ANNOUNCEMENT

The Fifth Annual Meeting of the Kansas Entomological Society will be held on Saturday, April 27, 1929, at the Kansas State Agricultural College in Room 53, Fairchild Hall. The Business session will be held at 9:00 a. m., and the afternoon session will be devoted to the readings of papers and the final business session. Dr. H. B. Hungerford will give an illustrated talk on his European trip.

R. L. PARKER, Sec'y.
P. M. GILMER, Pres.

KANSAS ACADEMY OF SCIENCE MEETING

The sixty-first annual meeting of the Kansas Academy of Science will be held at the Kansas State Agricultural College at Manhattan, April 25-27.

APRIL 25. Chemistry and Physics Papers in afternoon. Lecture on "Chemical Warfare" by Major Haig Shekerjian of Fort Leavenworth in evening.

APRIL 26. Papers and business all day. Banquet. Address by retiring president Wooster. Lecture dealing with ductless glands and probably with reproduction by Dr. Herbert N. Evans, University of California, in evening.

APRIL 27. Business and papers in forenoon. Entomologists and Psychologists meet separately for part of the day.

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